JPRS 82775

1 February 1983

West Europe Report

SCIENCE AND TECHNOLOGY

No. 136

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BIOTECHNOLOGY

CHEVENEMENT ANNOUNCES PROGRAM TO MOBILIZE BIOTECHNOLOGIES

Paris AFP SCIENCES in French 22 Jul 82 pp 1-16

[Article: "Scientific Research Policy and Organization"]

[Text] /A "mobilizing program" for biotechnologies/ [underlined in text]--To control 10 percent of the world biotechnology market, projected to reach Fr 250 billion by the end of this decade, is the goal of the "mobilizing program" which the minister of research and industry, Jean-Pierre Chevenement, unveiled to the press on 19 July.

This program, spread out over 3 years, provides for government funding (in the form of development credits to industry and grants to laboratories and state-controlled research organizations) at a level of Fr 1.1 billion in 1982, a figure which should increase to more than Fr 1.4 billion in 1983. It should stimulate Fr 1 billion in investments over the next 3 years.

France is not in bad shape in this field, since it controls 7 percent of the world market in modern biotechnologies (which excludes the traditional areas of wines, cheeses, etc.), a market presently estimated at Fr 140 billion and engaging some 2,000 enterprises in France. However, stressed Chevenement, the lead taken by the United States and Japan requires us to make a large effort if our country wants to "remain in the running."

The mobilizing program was drawn up by a task force including researchers and representatives from industry and the relevant ministries and headed by Pierre Douzou. In a 70-page document, this task force presents its recommendations as to the conditions for achieving the desired advances and delineates priorities and intermediate-term objectives, as well as the total amount of investments and corresponding terms and conditions.

An unpublished supplement sets forth some 50 specific objectives and some 40 projects concerning those enterprises (including the small and medium-size industrial enterprises) "which will have been launched already or in the imminent future." These projects deal with the pharmaceutical, chemical, agronomical, and food and feed sectors.

The large research organizations involved (CNRS [National Center for Scientific Research], INRA [French Institute for Agronomical Research], the

Pasteur Institute, AEC [Atomic Energy Commission], INSERM [National Institute of Health and Medical Research], etc.) are urged to let down their barriers and work with the large enterprises (Pechiney, Sanofi, Rhone-Poulenc) or the small and medium-size industrial enterprises on specific projects as participants in "scientific interest groups" (GIS's) or "public interest groups" (GIP's).

In parallel, an effort will be mounted to promote the mutual exchange of information between researchers and industrialists, in the interests of ensuring good liaison between research and industry, mobility of researchers and proper training.

This mobilizing program will be administered by an integrated task force at the Ministry of Research and Industry (MRI), the program strategy being entrusted to an interministerial "coordination committee."

These structures will be complemented by a "national committee" headed by the minister and including "qualified representatives of the socioeconomic forces of the nation." It will have the task of "oversight to provide guidance and evaluate the expected progress" and will provide a mechanism for coordination among all the partners. The same organization will be imposed on each of the other six mobilizing programs now in preparation for the various other sectors crucial to the nation's economy.

I. Axes of Research

Biotechnologies do not constitute a specific discipline, but are the resultant of multidisciplinary operations bringing together specialists from various disciplines, and it is important to develop these disciplines individually, then coordinate them, guarding against draining manpower to applied research through ill-considered personnel transfers, but on the contrary reinforcing the individual disciplines and building the structures necessary to the progress of the coordinated technology. The research to be done is usually technically complex and very competitive. Special attention therefore should be given to the quality of the personnel and the programs.

Particular support should be given to:

1. Research relating to understanding, modification and preparation of the "actors" in the biotechnologies--microorganisms, animal and plant cells, and enzymes:

--Genetics (genetic engineering, cell fusion, etc.)
--Microbiology
--Enzymology
--Immunology (including monoclonal antibodies)

Appropriate measures should be taken for the purpose of inventorying, preserving and protecting strains of plants and animals of industrial interest

and other genetic natural resources, from which new innovations in genetic material can be derived. Domestic and European projects for setting up collections of strains ought to be worked out; financing for these projects will be provided under DESTI [expansion unknown] program contracts.

2. Studies of biological reactions and of their execution:

--Kinetics of growth and production
--Stoichiometry and yield
--Microorganisms and cell culture
--Enzyme engineering
--Reactors
--Extraction and purification
--Equipment for analytical control and chemical synthesis

3. Final research relating to development and commercial applications in the agro-nutritional, chemical, pharmaceutical, environmental and renewable energy sectors.

While axes 1 and 3 are largely being taken up by the various research organizations, axis 2, which corresponds to biotechnologies in the direct sense, is getting only very limited attention.

This is why it is being recommended that this research be written into the programs of the organizations and that specific resources, both human and material, be allocated to it, while modifying the structure of this or that commission as the need arises.

At present, all fields of application, and the goals implicit in each field, should be explored, because they concern existing industrial activities.

In certain cases there is no chance that the competitiveness of the sectors that would be beneficiaries of this research can be sustained or increased except to the extent that an ongoing assessment of the progress in the biotechnologies is ensured: this particularly involves agriculture (seeds in particular), some food and feed industries, and some drug industries; obviously it would be "suicidal" for a country wishing to remain in control of its development not to make every effort necessary to take up the challenge thus issued. In other cases the processes arising from biotechnology will be in competition with others arising from chemistry, for example. Presently it is impossible to say which of these technologies will win out in the various sectors affected.

It is up to the industrialists to make the choice of what products to develop, taking into account the socioeconomic environment in which they are immersed.

Without giving an exhaustive list, we may cite, besides improvement of the traditional products of the agro-nutritional industries,

--production of amino acids, antibiotics, vitamins, vaccines, hormones, enzymes and immunoglobulins for therapeutic or diagnostic uses in the field of human and animal health;

--production of solvents, organic acids, fuels and fine chemicals in the industrial products field;

--commercial development of biofertilizers, biopesticides and of course new varieties of seed and new races of animals in the fields of agriculture and animal husbandry;

--commercialization of strains of microorganisms capable of being used in bioleaching and biodegradation in the environmental protection field.

--design and development of analytical measurement equipment or chemical synthesis equipment for carrying out biochemical or biological reactions.

Given the extreme variety of products accessible via biotechnological paths, it seems important to the task force that a coordination between government and industry be established, since products of strategic interest or needing lengthy periods for refinement and development are involved. The public authorities should also promote the emergence of new enterprises through adequate development of the necessary scientific and technological foundations.

For the present, it thus is important that the scientific base and the technological component of the bioindustries be developed in such a way as to prepare for the advent of these bioindustries.

Policy for the Research Organizations

A. Large Research Establishments

Progress in the biotechnologies rests on the development or broadening of several major axes of research which should furnish the knowledge, methodology, and training necessary for industrial developments, while not neglecting to probe for a deeper understanding of the mechanisms of cellular regulation.

This involves:

1. General and industrial microbiology (considering microbiology in the sense of "knowledge of microorganisms");

2. Molecular and cellular genetics (genetic engineering, cell fusion and hybridization, including monoclonal antibodies);

3. Biochemical engineering (enzymology, bioconversions, reactors);

4. Animal and plant cell culture;

5. Process and systems engineering (reactors, extractions, purifications, computerization, robotics, etc.).

In the large organizations the development of these various axes takes on special characteristics and may require horizontal efforts to overcome the compartmentalization policies of the organizations, and interinstitutional efforts which should be coordinated by the task force on biotechnologies.

The recommendations which follow pertain to the principal research organizations and universities and take into account the existing specialization as well as the need to promote certain areas of research. The recommendations in question largely correspond to the options formulated by the organizations themselves. To keep these recommendations from being purely theoretical, it will be essential that the mobilizing program's steering structure examine in detail the budgets allocated for the recommended and planned operations.

Furthermore, coordination should be established quickly between the steering structure and responsible officials at the research organizations so that the officials can steer programs and coordinate research as the need arises. As has been said, progress in biotechnologies rests primarily on an organizational effort introducing favorable coherence of effort, while taking into account existing structures, yet also while eliciting flexibility in those structures in view of their adaptation to the imperatives of the desired advancement.

CNRS [National Center for Scientific Research]

CNRS should take part in all the previously defined axes. Axes 1, 2, 3 and 4 primarily relate to the life sciences sector. Nevertheless, the chemistry sector should play a role in axis 2 (synthesis of oligonucleotides essential in genetic engineering), axis 3 and axis 5.

The engineering physical sciences sector should become involved in axis 5.

In particular, CNRS will see to:

1. Effective intervention in the chemistry and engineering physical sciences sectors for the support of biotechnologies.

2. Substantially intensified support contributed to microbiology.

3. The rapid advancement and financing of the planned Institute of Plant Molecular Biology in Strasbourg.

4. Ensuring that recruitment of researchers into the intrasectorial "horizontal" fields or fields overlapping several sections (for example: researchers in the fields of enzyme engineering and fermentations) can take place under favorable conditions.

Also, CNRS--through its life sciences sector--should maintain its role as an originator in fundamental knowledge in molecular and cell biology, while encouraging its teams to diversify its patterns of research.

INSERM [National Institute for Health and Medical Research]

INSERM should continue and intensify the effort which it has authorized in recent years in the field of animal molecular and cell biology, to capture an early lead in the processes of abnormal human biology and to be in a position to exploit knowledge about cellular metabolism with a view toward diagnosis and treatment.

This organization in particular should direct its efforts to:

1. Genetic engineering of prokaryotic and eukaryotic cells, especially animal cells;

2. The processes of cell fusion and hybridization of animal cells;

3. Process and systems engineering;

4. Production of bioreagents for analysis, vaccines, monoclonal antibodies, and new cell-derived products for therapeutic purposes.

5. Medical microbiology, which will need to be developed upon new bases.

INRA [National Institute of Agronomical Research]

INRA should seek to substantially build up its capability in molecular biology in the broad sense, with particular coverage of genetic engineering and plant molecular biology.

More particularly, INRA should:

1. Develop its competence in the area of soil microbiology and plant/microbe relationships (biological fixation of nitrogen, mycorrhization) with the aid of modern techniques of biology.

2. Develop the molecular biology of plants in coordination with CNRS. An early priority will be to provide speedy support to the laboratories set up at Versailles.

3. Set up the INA [National Agronomy Institute]-INRA Transfer Center, which is planned to be built at Grignon with financing from the Ministry of Agriculture and the Ministry of Research and Technology.

4. Integrate biotechnologies (involving protoplasts, haploids, in vitro methods, cloning of genes, etc.) into the strategy for creation of new plant varieties and increasing the number of plant species.

5. Develop new techniques for biological control (biopesticides, selection of insects, nematodes, and other auxiliaries for biological control).

6. Promote advances in the agro-nutritional industries by infusion of modern biotechnological concepts (for wine, milk, grains, metabolites).

7. Develop new animal genotypes by micromanipulation of eggs and mammalian embryos and injection of cell hybrids. Improve strategies for selecting for milk production by working out the details of the gene regulation mechanisms involved.

8. Develop a program for veterinary vaccines, which can constitute a specific target for application of genetic engineering, and diagnostic reagents--once monoclonal antibodies are obtained.

9. Develop the fermentation research axis by implementing the techniques of computer science and robotics.

10. Develop a policy of recycling part of these researchers to the aforementioned fields.

The three organizations, CNRS, INSERM and INRA, will establish a coordinated program for equipping research groups which will switch to genetic engineering. For the laboratories not engaged in molecular biology, such a conversion would mean sizable expenditures for equipment. The funding programs should commence in 1983.

Pasteur Institute

The Pasteur Institute has played a motivating role for several sectors in the biotechnologies. It should continue to receive increased resources to enable it to fulfill this role. The establishment of a Biotechnologies Building, financed largely with public funds, will be a step in this direction. More particularly, the Institute should seek to:

1. Formulate a clear policy concerning the scientific and technological priorities for the future Biotechnologies Building;

2. Proceed with its immunology program with increased funding for the Immunology Building (opened in 1981) and the Hybridolab;

3. Carry on with its program of research on genetic engineering and molecular virology;

4. Make a substantial effort to support microbiology, including the study of microorganisms, besides E. coli, which are important in applied fields (industrial and medical microbiology, soil microbiology) particularly for the environment (biological control);

5. Support genetic toxicology and initiate research in plant molecular biology;

6. Develop the infrastructure associated with biotechnologies, including: microbial cultures, microorganism strain banks and data processing support for genetic engineering activities and other biotechnological purposes;

7. Continue the effort undertaken for the development of its training programs, particularly in biotechnology, microbiology and immunology.

AEC

The AEC should continue its efforts in the three biotechnology sectors where it has special expertise:

1. With labeled molecules (as support for the biological techniques in radioimmunology, as well as in the agro-nutritional, plant health and pharmaceutical fields).

2. In the study of membrane phenomena, particularly in the field of bioenergetics to establish a program for development of bio-solar technologies.

3. The AEC should also contribute its experience in chemistry and in chemical engineering to participate in the development of biochemical engineering and related techniques.

ORSTOM [Bureau of Overseas Scientific and Technical Research]

The Bureau should carry on its efforts along several axes where it has achieved renown

1. nitrogen fixation

2. biological control with the use of entomopathogenic viruses

3. bioconversion of substrates of agricultural origin by filamentous fungi: the Bureau is to support the establishment of a fermentation laboratory and a pilot plant for fermentation of solid media in Martinique.

The Bureau should also undertake studies on

1. the "in vitro" vegetative propagation of oleaginous Palmaceae.

2. the potential applications of natural products of biological interest isolated from plant or animal organisms (at the phytopharmacology laboratory in Cayenne).

GERDAT [Study and Research Group for the Development of Tropical Agronomy]

The projects entrusted to GERDAT can be collected under three rubrics

1. biotechnology of plants: live collection; new methods of selection (this should be coordinated with ORSTOM)

2. fermentation (cacao, oils, coffee pulps)

3. obtaining vaccines for tropical stock farms and ranches.

B. Universities

The universities can and should play a considerable role in the development of biotechnology research: by building up the capabilities of the centers already affiliated with the universities, while examining the possibility of creating new ones, and by establishing federations among laboratories located at the same site, wherever that is possible and particularly at the establishments in regions with access to a substantial bioindustrial infrastructure and where large projects are being implemented.

These measures, after coordination between the Directorate of Research for Higher Education (DRES) and the Directorate of General Policy of the MRT [Ministry of Research and Technology], should be written into the pertinent budgets.

To that end, the DRES should explicitly identify those fields in which it wishes to participate in the advancement of biotechnologies, and thus in effect practice a program development strategy like that which is common in the research organizations.

A few poles of research should be selected quickly. The selection process should take into account the research capabilities of the designated universities as well as regional projects, a list of which is given later in connection with program proposals and priority projects.

The coordination advocated above should also extend to the research organizations, which can call upon affiliated teams in the universities, where it is envisioned that a program will be developed in the field of biotechnologies, to harmonize the policies and to pool efforts and resources at the designated sites.

Partnerships with industry on contractual bases should be encouraged as much as possible. The formation of GIS's should be encouraged.

Finally, there is no way to promote the development of research in the universities without exploiting the teaching potential, and here we have another occasion to say how essential the role of the universities will be in the training of research specialists and suitable manpower, and how much the level of the centers, groups and teams being dedicated to biotechnologies will be the best guarantee of the level of teaching offered, by the statutory instructors as well as by the researchers induced to participate in the training effort.

C. Agricultural Higher Education: ENSA-ENV [expansions unknown]

It is essential that all the talents and capacities assembled in these schools be allowed to express themselves fully at the research level.

1.2. Products

The choice of target products arising from biotechnologies takes into account several factors: the existing competition on the world market, the recapture of the domestic market when that proves necessary, the problem of maintaining and strengthening the positions attained and the determination to maintain a presence in the economically promising strongholds.

The accent will be placed on the development of biological routes to product lines in the following areas:

1.2.1. Human and Veterinary Medications

--New-generation antibiotics.
--Hormones and animal cell metabolic products.
--Immunological substances: interferons, vaccines.
--Blood derivatives.
--Products for therapeutic nutrition.

1.2.2. Reagents

1.2.3. Farm Products

(program to be conducted in cooperation with the agro-nutritional task force)

--Seeds.
--Biopesticides.
--Biofertilizers.
--Exogenous and endogenous flavorings and food additives.
--New or improved strains capable of being used in industry for traditional fermentations (milk, cheese, fermented drinks, alcoholic beverages).
--Amino acids.
--Starch derivatives.
--Enzymes.

1.2.4. Chemical Feedstocks, Chemicals, Energy Compounds

--Intermediates for heavy chemistry and fine chemistry obtained by enzymatic routes.
--Perfumes and cosmetics.
--Metal salts obtained by leaching techniques.
--Energy compounds.

(in cooperation with the French Agency for the Management of Energy).

1.2.5. Biodegradation and antipollution agents

(in cooperation with the Environment Ministry)

2. Establishment of Intervention Measures

2.1. Overall Strategy

Table 1 displays the major axes of the biotechnologies in relation to their fields of application. In this table we have included the enterprises with a majority French interest (plus Roussel-UCLAF), already existing or in the process of being formed, having research teams available in the pertinent fields.

By way of comparison, a similar table compiled for the United States would have all its cells filled, with some 20 to 60 companies in each one, and in the case of Japan the situation would be similar with a slightly smaller number of companies.

Thus for our country the situation would clearly seem less favorable. French enterprises are virtually absent in certain high-priority areas. A reassuring note is provided by public research (Table 2), where the situation is better; we have teams available in nearly all the sectors, though they may not always have the necessary critical size. If transfer of knowledge is to take place with the industrial sector, it is necessary that the latter have at least minimal scientific teams to call upon, which implies the necessity for a crash program to foster industrial research.

We have indicated in Table 1 the enterprises which have requested support from MRT to either develop biotechnological research programs or set up subsidiaries in the most promising areas of bioindustry. For the immediate future we plan to provide maximum aid as rapidly as possible to the projects which are under appraisal.

As can be seen in Table 1, this program is not sufficient all by itself to enable French industrial research to assume a position in the chosen strongholds. Certain areas such as enzyme engineering are in danger of being totally neglected. To carry out this program we propose that the resources of the large national companies already engaged in bioindustry be utilized: SNEA [National Company for Agronomic Research] and Rhone-Poulenc. Government incentives to these companies can take various forms: partnerships between businesses and university laboratories or large research organizations on specific research topics, creation of poles for coordinated regional programs, associations between businesses and foreign partners who possess valuable know-how. To be effective this program should be carried out in close collaboration with the Ministry of Industry and the Ministry of Agriculture.

The program commitments take into consideration the specificity of the sectors with activity and the size of the scientific and industrial operators involved with biotechnologies.

--As concerns the sectors with activity, substantial investments in basic research should be made with minimum delay for pharmaceutical and medical applications and obtaining intermediates for fine chemistry and agriculture.

--For the large businesses and large research organizations still not very deeply involved with biotechnologies, the biotechnologies represent a set of techniques and procedures which in the intermediate or long term will open up applications not well perceived at present. The mobilizing program should help in the rapid establishment of this work tool. On the other hand, small and medium-size businesses, with the exception of service companies engaged in genetic engineering, should be supported on the bases of very product-oriented programs or defined and accessible processes, corresponding to a precise market demand.

For these various reasons a substantial portion of the budget for the entire mobilizing program should be put in place within 3 years of launching it.

Table 1. Biotechnologies and Their Fields of Application

	Drugs (including antibiotics, immunological derivatives and hormones)	Reagents (including) monoclonal antibodies and enzyme reagents)	Agricultural and Food Products (including seeds, human and animal food and feed, and biopesticides)	Feedstocks, Chemicals, Energy Compounds	Biodegradation and Antipollution Agents
Genetic engineering, microbiology	GJ Transgene* Genetica* (RP) Roussel-UCLAF* Pharmuka*	Intergene*	Agrigene* (Transgene)* Roussel-UCLAF* SNEA* BSN*		
Cell fusion	Rhone-Poulenc	Immunotech* Hybridolab* (Pasteur Inst)*	Clause SNEA* Limagrain		
Enzymes, enzyme engineering	Rhone-Poulenc	Biotechnika Biosys	Roquette		
Fermentation, cell culture	Roussel-UCLAF* Rhone-Poulenc Sanofi* Merieux Synthelabo		Lafarge-Coppee Bel, Bongrain, Sodima Rhone-Poulenc* Protex* Pernod-Ricard Air Liquide	E.M.C. Rhone-Poulenc	
Instrumentation, engineering and extraction purification processes	Rhone-Poulenc Biolafitte	Biosys	Biolafitte, Nordon Setric Technip (IFP) Speichim BSN		Degremont (Lyonnaise des Eaux) C. Generale des Eaux
Strain selection, data banks	Pasteur Inst.		Museum*		

*File under review at MRT. IFP = French Petroleum Institute.

Table 2. Large Organizations and Universities: Basic Research (poles of development: Pasteur Institute, INRA, INSERM, CNRS, universities)

	Drugs	Reagents	Agricultural Products	Feedstocks, Chemicals, Energy Compounds	Biodegradation and Antipollution Agents
Genetic engineering and microbiology, metabolism and cellular regulation	CNRS, INRA, Pasteur Inst., INSERM	INSERM Universities Pasteur Inst.	INRA (Versailles) INA ENV	AEC	
Cell fusion	Pasteur Inst. INSERM Universities	INSERM Universities Pasteur Inst.	INRA Universities		
Enzymes, enzyme engineering, bioreactors	Pasteur Inst. Universities CNRS	Universities	Universities INRA ENV	Universities IFP INRA	Universities CNEXO INRA
Fermentation, cell culture	Pasteur Inst. Universities	Universities CNRS INSERM	Universities INRA ORSTOM-IRCHA	Universities IFP CNRS	
Instrumentation, engineering and extraction purification processes		Universities	Universities IFP IRCHA	Universities CNRS IFP CEA	Universities
Logistic support: strain selection, data banks	Pasteur Inst. Universities CNRS	Universities CNRS	INRA Museum		

CNEXO = National Center for Exploitation of the Oceans
IRCHA = French Institute of Applied Chemistry Research

Certain regions (Auvergne, Brittany, Normandy, Aquitaine, and the central and Loire regions) have not been considered. If in these regions there in fact exist teams capable of contributing to the advancement of biotechnologies, their number and staffing strengths are modest. Furthermore, these regions are not the sites of any projects involving industries.

This does not in any way prejudice the attitude which the governmental agencies should take toward future initiatives on the part of any given regions. The governmental agencies should be very open to any possible initiative on their part.

Regions	Public Research (strong points)	Projects Associating State-Supported Research with Industry
Alsace (Strasbourg)	Biochemistry--genetics--genetic engineering--molecular biology of plants	Transgene: genetic engineering company Proposed subsidiary: Agrigene Project: Center for plant molecular biology (CNRS)
Burgundy (Dijon)	Fermentation--microbiology--animal cells	A GIS is being organized
Languedoc (Montpellier)-Rousillon	Biochemistry--genetics--fermentation	GIS under study--young team in training--bioreagent labs (including Biotechnica)
Lorraine (Nancy)	Microbiology--chemical engineering oriented toward biotechnologies	An agro-nutritional industries GIS
Midi-Pyrenees (Toulouse)	Biochemistry--microbiology--genetics--electrochemistry--enzyme engineering--fermentation--automation	A microbiology GIS--transfer center
Picardy (Compiegne)	Enzyme engineering--fermentation	Transfer center
Provence-Cote d'Azur (Marseilles-Nice)	Microbiology--biochemistry--immunology	Immunotech
Rhone-Alps (Lyon)	Biochemistry--microbiology--genetics	Intergene with Merieux Foundation--GIS and GIE with Claude Bernard University--ENS St Cloud [St Cloud Advanced Teacher Training School]

The task force which has worked out the project was composed of the following persons:

Permanent Members:

Messrs Douzou (President) Member of the Institute, Professor at the National Museum of Natural History
Siclet (Secretary General and Sector Delegate) Professor at Lyon University
Durand (Sector Delegate) Professor at INSA [expansion unknown] of Toulouse
Kourilsky (Sector Delegate) Unit Chief at the Pasteur Institute, Research Supervisor at CNRS
Robert Task Force Director, Research Supervisor at INSERM

DESTI:

Messrs Paillotin
Poss

Specialists:

Messrs	Bourat	Rhone-Poulenc
	Chambon	CNRS Institute of Biological Chemistry at Strasbourg
	Feillet	French Institute for Agronomical Research
	Heslot	National Agronomy Institute
	Raynaud	Roussel-UCLAF
	Roncucci	Center for Research Clin Midy
	de Rosnay	Pasteur Institute
	Salomon	Institute for Scientific Research on Cancer
	Schwartz	Pasteur Institute
	Thomas	University of Technology of Compiegne
	Dupont de Dinechin	Ministry of Agriculture
	Fiszel	Ministry of Economy and Finances
	Laudrin	ANVAR [National Agency for Valorization of Research]
	Lelong	Ministry of Industry
	Lucas	Ministry of Agriculture (DIAA)
	Olivier	Ministry of Industry

Some individuals, groups, institutions, and companies have contributed, by their suggestions, to the labors which have led to the present document, a collective work realized with the competence and energy which the envisioned field of activity requires.

The principal concern of the Task Force, which in accordance with the wishes of the Minister was set up as a not-very-numerous team of high caliber, was to take into consideration the previous analyses by working out the numbers, the existing means by identifying them and coordinating them, and last the requirements resulting from the projects already undertaken or in the process of being set up, as well as the reasonable expectations as to future trends.

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ERICSSON '16' COMPUTERS, PERIPHERALS, SOFTWARE EXAMINED

Paris ZERO UN INFORMATIQUE HEBDO in French 22 Nov 82 pp 32-33

[Article by Eric Marshall]

[Text] The Ericsson line consists of three main families: products for management--small machines able to supply the conventional processing of a PME-sized (small and medium-sized enterprise) company; financial systems (an unquestionable success) organized around central units of the previous line; and IBM-compatible terminals (original equipment in a field in which it is very difficult to be original).

IBM-Compatible Terminals and Financial Systems: Stars of the Ericsson Line

Most of the time, the Ericsson Series 16 is marketed with packaged applications software systems, designed to meet the needs of very specific users:

Odin, for orders, billing, and inventory;

Loki, Frey, and Thor, for supplier, customer, and general accounting, respectively;

Mimer, for text processing.

This software is available in French, German, English, Dutch, and Swedish.

Ericsson France offers two additional packages: Siga, for automobile dealers, and Gefa, for air freight.

Ericsson's D 16 series currently includes five models: D 16/1, D 16/5, D 16/20, D 16/30, and D 16/40; they range from the simple single-station D 16/1, to the powerful multi-station D 16/40.

This series, the first studies for which date back to 1975 and thus to Datasaab, was announced only in 1978; it is sold for the management of small units, such as PME or branches of large decentralized enterprises. It is designed for a double purpose: to work in real time locally from transactions written in COBOL, and to have all the facilities for integration into a network architecture.

Two versions of the color Alfaskop

Characteristics	Alfaskop 4112	Alfaskop 4113
Number of characters	1920/2560	1920/2560
Number of lines	24/32	24/32
Number of characters per line	80	80
Character matrix	9x16/9x12	9x12
Point matrix	7x14/7x10	7x10
Number of colors	4	7
Symbols	No	Yes
Blinking, underline, reverse video	No	Yes

This is perhaps why most of the Series 16 business has been with very large industrial and commercial accounts (most often on the basis of applications software systems).

Equipment With Few Surprises

In analyzing the Series 16 specifications, one is forced to acknowledge that it has no particularly surprising elements. This is conventional equipment, with a configuration that is less extensive than that of some of its competitors (IBM, DEC, Hewlett-Packard, and so on), whose qualities are mainly of a software nature.

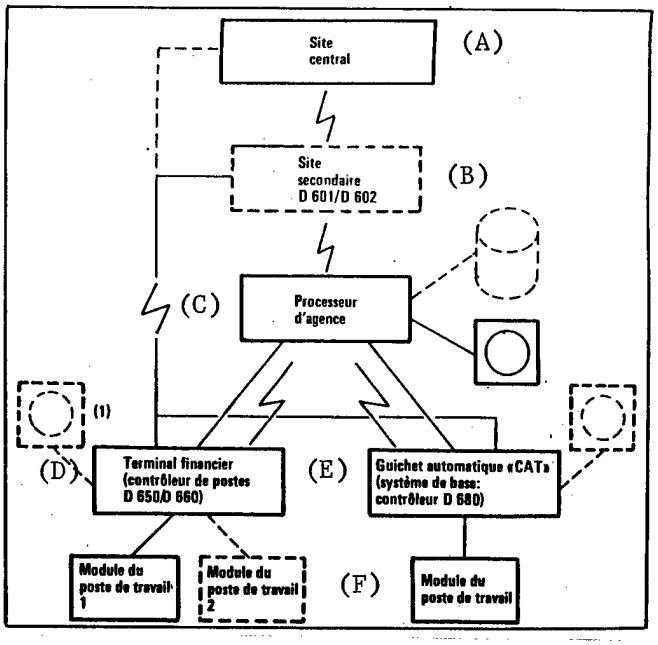
The D 16/1 is a 48 Kb single station, intended for small local applications, in an exclusively Ericsson environment. Otherwise it would not be competitive.

The D 16/5 can have as many as four stations, and compared to the D 16/1, has primarily a much larger disc storage capacity, at 288 Mb . However, being at the bottom of the line, it is not directly programmable in COBOL, and can only execute a code generated on a more powerful machine.

The D 16/20 is the first system in the series on which it is possible to carry out development. This is why it is also the most widely installed equipment. It has 16 work stations of 128 Kb each, and five communication lines, compared to a single one for the D 16/5.

The D 16/30 and D 16/40 are the top-of-the line machines in the series, the first being limited to 128 Kb of memory against 512 Kb for the second, 32 stations against 64, and five communication lines against eight.

It should also be noted that in addition to COBOL, the D 16/30 also supports the LOGIC programming language, which was the language of the former D 15 series of the same manufacturer. The transitions from one generation to the next therefore occur on the D 16/30.



Three-level architecture for financial systems: central location (non-Ericsson), branch processor, and specialized or non-specialized work stations.

Key: (A) Central location
(B) Secondary location D 601/D 602
(C) Branch processor
(D) Financial terminal (station controller D 650/D 660)
(E) CAT automatic teller (basic system: D 680 controller)
(F) Work station module

In terms of peripherals common to the entire line, it is interesting to note that Ericsson had a choice between six different disc units of 10, 24, 48, 60, 72, or 220 Mb , for a maximum of four units, or 880 Mb, and between three screens, depending on display capacity requirements and connection needs.

The WS 610 displays 12 lines of 80 characters (960 chars), the WS 620 has 25 lines of 80 characters (2000 chars), but can only have local connections, and the WS 622 has the same capacity but can be placed remotely.

These three screens display upper and lower case, yellow on a black background (7x9 matrix), and are particularly legible, as in fact are all the Ericsson screens.

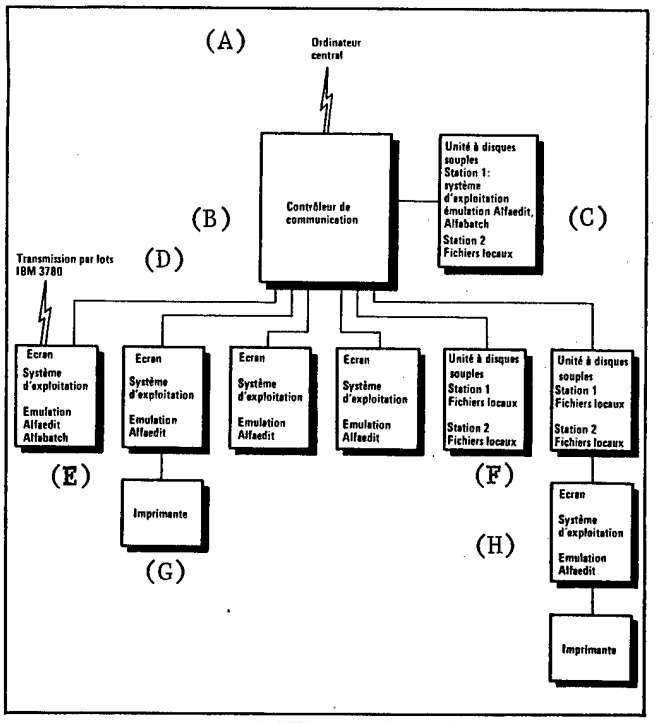
Up-To-Date Software

The characteristic aspect of the D 16 software is obviously that of a multi-task, interactive system, oriented toward real time applications.

Characteristics	D 16/1	D 16/5	D 16/20	D 16/30	D 16/40
Common features:					
Central processor	4 accumulators, 2 indexes, 130-158 machine instructions, 2048 to 3072 X 64 bits of PROM controlled memory, cabled multiplication/division, battery back-up, clock, self-loading, re-boot.				
Data format	16 bits per word, 16 or 32 bits in fixed-point, strings of 31 digits and 4095 characters, 16-, 32-, 48-, or 64-bit instructions, ASCII code.				
Input/output	Standard DMA, 2.7 Mb/s maximum I/O, vector interrupt system, 6 interrupt levels.				
Memory	MOS, 0.75 microsecond/word, 0.5 microsecond/word access time, 48 to 512 Kb, parity.				
Memory capacity (Kb)	48	64	64-128	64-128	128-512
Discs: pack/cartridge	Cartridge	Cartridge	Both	Both	Both
capacity (Mb)	10	10-288	10-288	10-288	10-288
Work stations :					
number of stations	1	1-4	1-16	1-32	1-64
characters displayed	960/2000	960/2000	960/2000	960/2000	960/2000
printer (cps)	--	45	45	45	45
remote (chars/screen)	--	2000	2000	2000	2000
Printers:					
series (cps)	45,60,120	45,60,120	45,60,120	45,60,120	45,60,120
parallel (lpm)	200	200	200,600	200,600	200,600
Communications:					
max. transmission (bps)	--	19200	19200	9600	19200
max. number of lines	--	1	5	5	8
Other peripherals:					
magnetic tape	--	--	--	10 Kbps (800 BPI) or 40 Kbps (1600 BPI)	10 Kbps (800 BPI) or 40 Kbps (1600 BPI)
floppy discs (Kb)	--	250-500	250	250	250
punched cards (cpm)	--	--	--	285	285
Software:					
COBOL	yes	yes	yes	yes+LOGIC	yes
files	DIBAS	DIBAS	DIBAS	DIBAS	DIBAS
communications	--	2780/3780	2780/3780 NTR 3270	2780/3780 NTR 3270	2780/3780 NTR 3270
real time OS	yes	yes	yes	yes	yes

Four major traits are most apparent:

All the programming is in COBOL, the compiler being derived from COBOL 74 with real-time extensions.



What an Alfaskop will do.

Key: (A) Central computer
(B) Communications controller
(C) Floppy disc drive
Station 1: Alfaedit emulation operating system, Alfabatch
Station 2: local files
(D) IBM 3780 batch transmission
(E) Screen
Operating system
Alfaedit, Alfabatch emulation
(F) Floppy disc drive
Station 1: local files
Station 2: local files
(G) Printer
(H) Screen
Operating system
Alfaedit emulation

In the case of the D 16's, however, COBOL is first translated from the source into E-COBOL, which is an intermediate COBOL, and then interpreted and executed. Some of the machine instructions correspond to the most widely used COBOL instructions, and it is because of this stratagem that the machines are particularly efficient in terms of execution speed and memory space (one COBOL instruction needs only 6-8 bytes);

It is also a virtual memory machine with a pagination mechanism. Every compiled COBOL program has a "data" zone and a "program" zone, which the compiler divides into pages. The program zone is loaded into a "common memory buffer zone" which can be accessed by several stations simultaneously (re-entry into the zone). On the other hand, each station has its own data zone, corresponding to the called COBOL program. The common memory buffer zone is allocated dynamically and is designed to keep accessible the most widely used pages;

In the matter of files, the D 16 software offers an organization resembling that of a data base management system, which combined with advanced development resources, can hold its own against the other systems available on the market.

This organization, called DIBAS, has a broad selection of access methods and file structures:

Sequential;

Relative;

And indexed sequential, with three possibilities: ILD (Indexed Low Dynamics), an optimized structure which makes it possible to achieve a minimum number of disc accesses for files with low insertion rates; IHD (Indexed High Dynamics) for the opposite case; and IMK (Indexed Multi Key Access), an IHD extension with multiple keys. DIBAS also (and maybe especially) has a true catalog, DIC (Data Item Catalog), which contains a description of all the data structures accessible by the software;

As a fourth point, Series D 16 contains interesting development resources, called APPS, with file maintenance modules (creation, updating, and so on), grid management modules (without necessarily going through programming), and a report editor (report writer) whose commands, if need be, can be introduced into a COBOL program.

Ericsson and Bank Systems

Historically, Ericsson's bank activities (at the time of Saab Scania) go back to 1970, the year of a very large call for bids covering 7000 work stations, which the Swedish manufacturer had succeeded in winning despite the fact that at that time it was not yet very specialized in data processing systems.

This first contract was followed by many others, to the point where Ericsson has 40,000 installed units at present.

In France, Ericsson's "financial" activity dates back only to 1978, but the French subsidiary can already boast of the installation of 2000 stations (of which 1200 for Credit Agricole alone), among 14 customer banks. It should actually be noted that Ericsson claims to have captured 30 percent of the new business since 1978, and from that standpoint comes just behind Philips (32 percent) and ahead of such stars as IBM, Olivetti, or NCR (the "fabulous" business with Credit Lyonnais occurred before 1978).

Ericsson's financial system is thus aimed at large organizations, which always have a data processing system, most often an IBM. Ericsson's machines are compatible with IBM's, and are intended only for remote locations, typically branches of these organizations.

In a series named D 16, Ericsson thus offers branch processors, terminal controllers, and a diversified line of simple or specialized work stations.

Two branch processors are available, the D 601 and D 602, for installation at branch locations and to be connected to the central unit of the bank or financial organization. The work stations of the branch are linked to these processors locally or remotely. Peripheral management tasks are also assigned to these processors.

The D 601 can be equipped with 128 Kb of memory, and the D 602 with 256 Kb, but both of them are built with Series D 16 systems.

Each processor can be associated with 32 stations, with only their transmission rate being different: 50 Kb/sec for the D 602 and 30 Kb/sec for the D 601.

They can accept many peripherals: four 5610 2x10 Mb discs or four 5615 24 Mb discs (D 602 only), series printers (120 cps) or parallel printers (200 lpm), and so on.

In terms of software, the local processors are programmable in DIL (Datasaab Interpretive Language), a language designed for transactional applications.

Ericsson supplies a wide range of work stations, from simple terminals to equipment designed specifically for banks.

The simple terminals D 650 (D 651 for local use, and D 652 for remote applications) are modular and built around 3700 displays (5", 12x40 chars), 3710 displays (9", 12x40 or 12x80 chars), or 3740 displays (12", 12 or 25x40 or 80 chars), and of function (3430) or function and alphanumeric (3415) keyboards.

It should be noted that terminal controllers, capable of managing pairs of keyboards/screens, programmable or not, are inserted between branch processors and work stations.

While the Ericsson specialized terminals do not offer startling original features, they have the merit of existing and meeting the requirements of a financial organization:

Automatic tellers;

Automatic cash registers;

Window terminals, and so on.

All of them are of course designed with a concern for appearance and ergonomics, which we have to admit have become important elements of the manufacturer's brand image.

It cannot be denied that the Alfaskop 41 screen is a special case in the equipment available from Ericsson.

A Star: the Alfaskop 41 Terminal

The Alfaskop 41 stands apart, having been in its time the first true ergonomic terminal compatible with IBM's 3270. While the other compatibles were satisfied to emulate the functions of the IBM terminal at a more interesting cost, Ericsson's equipment added the largest degree of ergonomics, with an entirely revolutionary character display of yellow on a brown background, original display characteristics, diversified character selection, and many other advantages, which at the time made it a veritable star. The number on installations built so far serves as a testimonial.

Today, the first Alfaskop 41 has been replaced by a line of three terminals, the 4110, 4112, and 4113 (monochrome and color).

The 4110 is a monochrome station which emulates the IBM 3274 as well as the Univac UTS 400. It is a multiple-function terminal, capable of communicating with two host computers through a "dual host" device (the selection is performed directly on the keyboard).

With IBM, the 4110 is connected locally to an Ericsson 4102 controller (32 connections, 4015 software), and remotely, to a 4101 controller (also 32 connections). The monochrome screen handles 3520 characters with 24, 32, or 43 lines of 80 characters, in addition to one line reserved for system messages.

Various functions are available, normal, highlighted, or reverse video, blinking and zone underlining, as well as modification of the cursor shape and blinking frequency.

Needless to say, the characters are still yellow on a brown background.

The 4112 is a new screen which emulates the IBM 3279, capable of displaying four colors (red, green, blue, and white) and connectable to the usual Ericsson 4101 and 4102 controllers.

Color is determined by the functions of zones corresponding to highlights and protection. That is why a monochrome Alfaskop can be replaced by a color Alfaskop without the need to change screen programming. Display capacity in this case is only a maximum of 2560 characters (24 or 32 lines of 80 characters).

Lastly, the 4113 is the most recent version of Alfaskop. It is also an IBM-compatible color screen, capable of showing seven colors: the four basic ones, plus turquoise, magenta, and yellow.

This terminal, which has the same display capacity as the 4112, also has graphic functions that allow users to create their own symbols, signs, bars, curves, and so on.

Alfaskop Software

Various software packages can be installed on the Alfaskop terminal:

Alfaform permits the management, storage, and local validation of screen masks. Thus, when users request one of these masks, the central computer only needs to send a mask code, which reduces its intervention to a minimum.

Various controls are provided: similarity (by zone, an entry is validated if it conforms to a special combination of letters, figures, and characters), date, table, key figures (10 and 11), decimal point, compulsory zone, length, and interconnected zones;

Alfaword is a text processing program;

Alfaedit makes it possible to locally create files and programs, without loading the central computer. It behaves as a true text editor.

Alfaskop, Personal Computer

When equipped with a floppy disc (many peripherals can be connected to the work station, such as storage, printers, and so on) and provided with a UCSD operating system, Alfaskop becomes a true personal computer.

It can then be programmed in PASCAL, and of course, in BASIC.

11,023
CSO: 3698/120

PRESIDENT AFFIRMS PRIORITY OF ELECTRONICS IN INDUSTRIAL PLAN

Paris ZERO UN INFORMATIQUE HEBDO in French 22 Nov 82 pp 1, 36

[Article by Gerard Schmitt]

[Text] "Electronics will be at the heart of France's industrial revival," stated Francois Mitterrand at the closing of the workshop on industrial policy, held in Paris on 15 and 16 November. Surrounded by 11 ministers and chief executives of nationalized groups, and before some 800 participants, the chief of state indicated that an industrial priority will be assigned to the electronics sector within the 9th Plan. "The recovery of our data processing industry has begun," continued Mr Mitterrand stating that "CII (Compagnie Internationale d'Informatique) will receive large capital endowments so that it may finance the necessary research and development effort."

CII-Honeywell Bull Clearly Confirmed as Leader of French Data Processing Industry

Parallel approaches: after Research, and using a similar procedure of decentralized discussion, Industry is now the object of the government's concern, which should result both in the National Conference of the French Industry planned for 27, 28, and 29 June 1983, and in the formulation of a legislative draft covering industrial development, which will be integrated next autumn into the Second Plan Law. Held at the initiative of Jean-Pierre Chevenement on 15 and 16 November in Paris, two workshops have been the official starting point for this "long range discussion process."

Other events organized on several topics, will follow these workshops during the first half of 1983: research and industry, training, financing, quality, design, enterprise creation, commercial function, and role of staffs in enterprise management.

Eight Hundred Participants

The objective was to formulate an industrial policy for the France of 1990, and to "reconcile the French with their industry."

From these two days, which involved some 800 participants (staffs of the nationalized sector, high government officials, unionists, and to a lesser extent, representatives from the private sector), we will indicate some of the points raised about the electronics sector by Louis Gallois, director general for industry.

As he pointed out, the action program for the electronics sector is intended to give this industry both its impetus and its coherence. It revolves around six essential axes that are closely coordinated with each other: industrial action (investment and restructuring), accelerated research effort, development of new communications systems, inception of a training program, definition of a public purchasing policy, and installation of a coordination administrative structure. These various actions have already begun.

750 MF for CII-HB

The consolidation of the industrial structure has resulted in the completion of the nationalization program with the acquisition of the four subsidiaries of ITT-France, and with capital endowments or participatory loans in 1982, of 300 MFF for Thomson, 750 MFF for CII-HB, and 200 MFF for CGE.

The industrial restructuring aimed at simplifying and defining the functions of each group resulted in "the creation of two component centers around Matra and Thomson, which takes over from Saint-Gobain the activities of Eurotechnique," and in "the gathering of Sems and Transac around CII-HB, which thus clearly emerges as the French leader in data processing matters."

Bringing Sems and Transac Together

The stronger stimulating role of the government is characterized by higher credits available for the sector, which in the 1983 budget are 33 percent larger than in 1982 (8 billion francs in 1983 against 6 billion in 1982).

In the research-industry coordination, "six of the national projects planned by the Electronics Sector Task Force have begun, and the evaluation phases of the last two are completed."

In the essential area of training, "by January 1983, 1600 additional persons will be in training in seven regions, and the education of 100 trainers and 1000 personnel representatives is being launched by CNAM (National School for Arts and Crafts)." A complete action plan in this field will be announced at the beginning of 1983.

Thomson, Philips, Grundig

Lastly, manufacturers are currently examining together with the government, the international cooperations, particularly in Europe, that could be undertaken.

We might remember that in the area of consumer electronics (tape recorders, videotape machines), Thomson is currently negotiating with Philips and Grundig, and that discussions are being held between the government and Olivetti regarding the outcome of Saint-Gobain's participation in the capital of the Italian group.

11,023
CSO: 3698/122

ELECTRONICS

PHILIPS IMPROVES ELECTRON LITHOGRAPHY IC TECHNOLOGY

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 8 Dec p 5

[Text] Frankfurt, 7 Dec--In electron lithographic production of integrated circuits back scatter of electrons results in problems in drawing fine details that are in close proximity to each other. By using faster electrons, workers at the Philips Research Laboratories in Redhill (England) have successfully eliminated these problems, says the company's German subsidiary Valvo.

Details of about 2.5 micrometers can be reproduced well using normal photolithographic methods. The geometries are transferred by exposing a photosensitive film with which the wafer is coated. With extremely high-powered machines, such as the Philips "wafer stepper," a definition of less than 1 micrometer can be achieved. However, the definition is limited by the wavelength of light. If electron beams are used in IC manufacture instead of light, a line width of 0.1 micrometer is possible in principal, Valvo says. The geometries are written directly into the electron-sensitive layer on a silicon wafer, without using masks. The electrons focussed on the layer are scattered in both the layer and in the silicon substrate. This causes the photosensitive emulsion at both edges of a printed line to be exposed additionally, resulting in a certain amount of blurring of the geometries. As a consequence of this scatter, details in close proximity to each other in fine geometries are disturbed. This is called the proximity effect.

Philips workers in Redhill have shown that the disturbing consequences of this effect can be avoided if the electron beams have an energy of 50 kiloelectron volts instead of the usual 20 kiloelectron volts. These faster electrons are scattered deep in the substrate and hardly at all in the sensitive layer. The back-scattered electrons are distributed over such a large surface on both sides of a printed line that their number in the local radiation strength in the emulsion is sharply reduced. The results described here refer solely to laboratory tests and do not necessarily affect industrial production or the marketing of new products.

9581
CSO: 3698/128

ONE-MICRON WAFER ETCHING SYSTEM DEVELOPED

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 16 Dec p 7

[Text] In the manufacture of electronic chips on silicon slices (wafers), real advances in equipment and process technology can only be achieved by intensive research. High-quality exposure and etching technology is of crucial importance. Uniformity and reproducibility of free-etched fine electrical conductors and the desired high rate of production for plasma etching equipment depend on the possibility of precise control of the interconnected etching parameters. According to statements from Balzers, it is principally a question of capability, the partial pressure of the process gas and wafer temperature.

With the SWE-600 system, Balzers AG, which is owned by the Swiss Oerlikon-Buehrle company, recently presented a new possibility for etching wafers. It is a single-wafer cassette system with a charging lock, which operates on the principle of the plasma-/reactive ion etching process. The new machine was developed specially for anisotropic etching of 1-micron wide lines in nitrite, polysilicon, oxides, aluminum and aluminum compounds and other materials that are used for wafer manufacture. According to the company, the machine can achieve clean, controllable etching profiles with a high degree of uniformity and reproducibility.

The loss of quality of the photo resist in conventional equipment caused by high performance density no longer occurs in the new system. A cooling installation, which is the process of being patented, allows the temperature of the wafer to be held constant between 20 and 80°C, plus or minus 1°, and ensures that 60 wafers per hour can be produced. The exact uniformity and reproducibility of the etching profiles was made possible by, among other things, a newly constructed throttle slide, which gives precise control of the process-gas partial pressure in the etching chamber. The high vacuum required for plasma- or reactive-ion etching is achieved by using a turbomolecular pump. Other features of the SWE-600 system are the programmable, automatic process control, fully automatic HF [high-frequency] adaptation network, cold trap with automatic rinsing, multizone temperature regulator, multichannel-mass flow control and clean room compatibility.

9581
CSO: 3698/131

BRIEFS

PHILIPS-SIEMENS RESEARCH AGREEMENT--Munich, 15 Dec--Philips Gloeilampenfabriken NV, Eindhoven, and Siemens AG, Berlin and Munich, have concluded a general agreement for collaboration in the area of long-term research and development. The agreement covers basic research work; it excludes product developments which are ready for marketing. In the foreground of the discussions concerning the two companies' collaboration are certain aspects of new semiconductor materials, fundamentals of microelectronics, questions of submicron technology, computer-assisted development (CAD) and electronic speech recognition. The topics were selected in accord with the national subsidization objectives of the two governments and also with the efforts of the EEC, particularly as part of the Esprit program (European Scientific Program on Research for Information Technology). In the central research and development laboratories of the two companies about 50 scientists in each will be covered by the agreement. This number can increase later if the topics are expanded or if the collaboration becomes more intense. Siemens currently employs about 30,000 workers in research and development, spending about DM 3.3 billion annually. At Philips, about 24,000 workers are engaged in this area, and about DM 2.7 billion is spent. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 16 Dec 82 p 7] 9581

CSO: 3698/129

NEW TECHNOLOGY MAKES CHEAP CITY GAS FROM RESIDUAL OIL, PEAT

Stockholm SVENSKA DAGBLADET in Swedish 9 Dec 82 p 6

[Article by Margareta Artsman: "New Process Can Make Cheap City Gas From Peat"]

> [Text] Goteborg municipality will replace city gas produced from the expensive raw material butane with a new synthetic gas made from, for example, coal, residual oils, peat, even trash.

The new gas is produced by a new method--plasma energy--which was developed by SKF Steel of Bofors. It is environmentally harmless, cheap, and rich in energy.

"The plasma method will make city gas 20-25 percent cheaper," said the head of Goteborg Energy Plant, Olov Lagerholm. "Stockholm and Malmo are interested, and will share our experiences."

About one quarter million dwellings, several thousand villas and several industries in three cities use gas today.

In Use by 1985?

Goteborg Energy Plant has given SKF Steel the task of planning a coal gas installation. It is intended to be in the gas plant at Arendal. If the municipality makes the decision next year it can be in operation by 1985.

Plasma energy is a process which has its roots in the space program.

"But we have begun where NASA left off," said Hans Herlitz at SKF Steel. The method consists of the fuel being fed into a plasma generator where the gas reaches a temperature of 3,000-5,000 degrees. The gas is then ionized and converted to plasma. After filtration the gas has a temperature of 1000 degrees. Since it must be cooled down from the plasma furnace, the tradeoff gives hot water which can be used in the remote heating net.

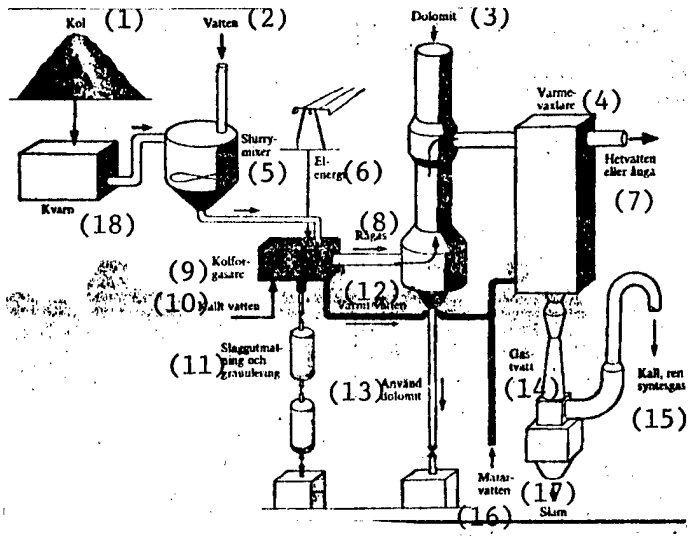
"In order to get out an energy-rich city gas, two-thirds fuel and one-third electrical energy are needed," said Olov Lagerholm, who says that he is convinced that electricity will never be more expensive than other types of energy. The new synthetic gas is also clean since combustion takes place without oxygen, and neither sulfur dioxide, nitrous oxide nor other dangerous substances are formed.

Today eight municipalities in the country have city gas. In Goteborg 40,000 dwellings, Stockholm 160,000 and Malmo 20,000, but the price of butane continues to rise, and can not bring businesslike prices.

"In Stockholm the politicians have voted for 7 years to eliminate gas," said Torbjorn Stenudd. "This year they had a 15 million deficit. We are interested in this process."

In the future everyone sees natural gas as a substitute. Malmo expects gas from Denmark in 1985.

"City gas is easy to handle, and therefore we want to keep it," said Olov Lagerholm.



Caption: The new gas production method has been developed by SKF Steel in Hofors. The process has its roots in NASA's space program.

Key:
1. Coal
2. Water
3. Dolomite
4. Heat exchanger
5. Slurry mixer
6. Electrical energy
7. Hot water or steam
8. Raw gas
9. Coal gasifier
10. Cold water
11. Slag discharge and granulation
12. Hot water
13. Used dolomite
14. Gas scrubber
15. Cold, clean synthetic gas
16. Feed water
17. Silt
18. Mill

9287
CSO: 3698/136

AUTOMATED FORGE INCREASES PRODUCTION AT PEUGEOT

Paris INDUSTRIES & TECHNIQUES in French 1 Sep 82 p 30

[Text] To improve working conditions, save energy and space, and increase productivity: these were the goals sought in developing an integrated automated forge unit. Such units are used to make finished pieces such as differential rims, wheel hubs, and connecting rods from raw steel rods.

In 1978, the first integrated production line, equipped with a 1,000-ton press, was installed in the plant. Since then, two other automated forge units have been added. One has a 3,000-ton press and the other a 4,000-ton press. Both are high-performance pieces of equipment.

The hourly production rate is 1,200 pieces instead of 240, as in a conventional forge. The power supply for the heating unit and the hot shearing unit provides energy savings of over 20 percent. The automated and continuous performance of the various operations eliminates the need to store slabs before forging and after cold cutting.

By using the automated forge system, nonproductive surfaces are eliminated. Furthermore, the automation of these forge lines significantly reduces the environmental noise level in comparison with the noise level in a conventional forge, and it eliminates all manual handling of the pieces.

The unit consists of several carefully arranged elements. The steel rods, with a diameter of 65 mm and 6 meters in length are placed in a storage and supply area. A 1700-kW induction furnace, used to heat the rods to a temperature of 1200°C, receives an automatic and constant power supply. This is provided in the form of a medium-frequency current by a static wave device, which is more economical than a conventional rotary unit. Its heating capacity is 4.6 tons of steel per hour. A hot shearing unit, with a force of 50 tons, cuts the heated steel rods into slabs. If done cold, the same operation could require

the use of a 300-ton press. This, of course, means that there are truly significant energy savings. The length of the slabs corresponds to the length of the piece to be forged. The forging press, with a power of 3,000 tons to 4,000 tons, follows the integrated unit. It is equipped with automated supply, transfer, and removal systems for the pieces. It has five work positions which perform the operations of crushing the slab, rough planing, finishing, trimming, and clearing of the piece.

Robotics has played an important part in the increase in productivity of these integrated forge systems. In this way, the operator-machine relationship has been greatly modified.

The training policy has led to a highly motivating enrichment of work and job responsibilities. The worker's creative abilities are focussed on monitoring and control of this complex system of automated production. The machine operators have requested that they be given the necessary training and that a programmed maintenance system be set up.

7679
CSO: 3698/88

FRENCH MATERIALS RESEARCH PROGRAM ANNOUNCED

Paris LES ECHOS in French 22 Nov 82 p 8

[Article by Jacqueline Mattei: "New Materials: A Priority Program"]

[Text] Materials are in the spotlight. Six months ago, Jean-Pierre Chevenement entrusted Jean-Pierre Causse (Saint-Gobain research director) with a mission on this theme; now, he is announcing a first measure: the launching of a priority materials-research program.

According to the mission, materials-related activities in France account for over 2 million industrial jobs and sales in excess of 700 billion francs. Materials are at the heart of our daily lives (housing, health, leisures), and also at the heart of large programs (aerospace, nuclear, electronic programs). The research policy carried out since the war favored large programs, but when the time came we often found we did not have the materials needed. From now on, we must not just assume that large projects are the only factor involved in developing materials. We must realize that materials may be the driving force in designing projects.

Research in this field, therefore, has become essential. It must anticipate industrial needs and remain organized loosely enough to progress continuously. Developing materials involves both science and engineering: determination of mechanical, physical, chemical behavior laws; development of production and processing methods.

The mission is also convinced that the opposition between traditional and new materials must be overcome. Certainly, materials are increasingly sophisticated and often mixed together. This is the case of composite materials proper (carbon and synthetic glass fibers), and also that of multilayer packaging materials and insulating-layer glass panes. Traditional sectors, which remain predominant, respond to these changes by adapting themselves (light glass, light steel).

France has its strong points: industries which are among world leaders (aluminum, glass), enterprises exploring new avenues (carbon fibers). But it also has its weak points: industrial sectors which tend to live on past achievements (steel industry); it also has actual deficiencies (silicon industry).

Doubling State Aid Over Three Years

This analysis must be used as a basis to make decisions. Jean-Pierre Causse's mission defines 11 priority themes:

- four horizontal themes aim at the acquisition of knowledge and expertise with respect to extremely diverse materials: behavior laws, surface treatment, production and energy savings, thermo-mechanical treatment;

- five additional themes focus on materials, expertise in which will condition our technological future: polymers, technique [as published], composite materials, ceramics, amorphous alloys, electronic components;

- the last two themes: wood and new housing materials, have a direct impact on our balance of trade and energy savings. The required funds remain to be found. Total expenditures for materials research and development amount to 10 billion francs per year; but public aid to this large sector is modest: 150 million francs, all financing sources included (most of that amount comes from the three Ministries of Defense, Posts and Telecommunications, and Research and Industry). Considering the present climate of austerity, incentives in constant francs could even decline in 1983.

Jean-Pierre Causse advocates allocating 1 billion francs of credits to research over the next three years, i.e. a 2.2-fold increase. Jean-Pierre Chevenement agrees with this estimate: "Aid must be doubled over three years." But all he can promise is "to write in this sense to those of his colleagues who are concerned." Another means of action, however, is available to the minister of industry: he can take the materials factor into account in scheduled contracts with the most directly concerned large national enterprises (Pechiney-Ugine-Kuhlmann, Saint-Gobain, Usinor, Sacilor), which have been promoted to the rank of large industrial operators.

9294
CSO: 3698/121

ASEA ATTEMPTS TO PENETRATE JAPANESE ROBOT MARKET

Stockholm DAGENS NYHETER in Swedish 7 Jan 83 p 6

[Article by Lennart Gustafsson, DAGENS NYHETER's special correspondent in Tokyo: "ASEA Trying Hard to Sell Robots to Japan"]

> [Text] "Before 1989 we will be one of the five biggest in Japan," said Nils Hornmark, the leader of the Gadelius attempt to break into the Japanese market with ASEA's robot program.

But Gadelius and ASEA have a long way to go before they reach that goal. So far there is only one Swedish robot installed in Japan. If Gadelius succeeds, that means that they must sell 300 robots per year to Japanese industry by the end of this decade.

"This is an object lesson," said Nils Hornmark. "If we reach our goal to be one of the five biggest in Japan, that means that we can compete with the Japanese at home. This is something which most Swedish firms seem to think is impossible."

Search for New Product

Gadelius is going to begin by only assembling the robots in Japan. The parts will be delivered from ASEA's factories. Later it is intended that both the manufacturing and assembly will take place here.

The motives which led Gadelius to compete in the Japanese robot market are several. The firm has been in Japan for 75 years. But during recent years the firm has searched for a new product in a fast-growing field. There has been a lack of new ideas in Gadelius' traditional areas.

At the same time ASEA was searching for a cooperating partner in Japan for its robot division. After having had discussions with a large number of Japanese firms the choice in the end was Gadelius. The two Swedish firms reached an agreement several months ago.

ASEA owns 50 percent of the stock of Flakt, which is the mother company of Gadelius, and this did not make coming to an agreement more difficult.

The newly created robot division of Gadelius, which so far only consists of 14 persons, now has the task of entering a market which many believe is the most difficult in Japan.

Very Demanding

"Japanese businessmen are spoiled," said Nils Hornmark. "They put a very high value on reliability. The service must be perfect. Delivery times must be met."

Competition is already very great. There is hardly a single firm with self-respect which is not manufacturing, or planning to begin manufacturing robots.

On the other hand not all the efforts are serious. It has been popular among the firms to spread news about planned robot manufacturing only to improve the value of their shares. The market is estimated to grow by 50 percent per year, so therefore the stock market has responded positively to such news.

So far ASEA's advantage has been that it has the only microprocessor-controlled robot on the market. The Japanese automobile industry today uses large numbers of hydraulic-controlled robots. They are now beginning to replace this first generation of robots, and therefore ASEA and Gadelius expect to participate

Eleven Automobile Factories

Naturally it is the automobile industry which is the large and attractive market. Today there are eleven automobile factories in Japan. The firms are now trying greatly to increase productivity in their factories, where wages are higher than in the Swedish industry.

Also the large suppliers to the automobile industry are interesting. But because of the large wage differences in the Japanese industry, where a Toyota worker can earn 10 times as much as a worker in a little supplier firm, the workshop industries are not as interesting from the standpoint of automating production with robots.

9287
CSO: 3698/136

DRAFT BUDGET FOR 1983 CIVIL RESEARCH, DEVELOPMENT VIEWED

Paris AFP SCIENCES in French 16 Sep 82 pp 1-5

[Article: "1983 Budget Draft Gives Priority to Research"]

[Text] "In the serious crisis that the world economy is experiencing today... it is fundamental for our country to provide itself with the necessary means to improve its international competitiveness in the face of the challenges launched by the other industrialized states and the new industrial nations. The budget of this ministry reflects the technological and industrial priority that the government is providing," declared Jean-Pierre Chevenement on 15 September while pressneting the Ministry of Research and Industry [as published] budget.

In order to do that, the minister added, "France must have strong research on which technological and industrial development should depend."

"The tendency to stagnation that had existed since 1978 has been completely reversed for a year now," the government has decided to give research and industry "the means to climb back up and we are now moving in the right direction," continued the minister.

Consequently, the public effort under the control of the ministry will exceed Fr 52 billion next year, or an increase of 35.7 percent in current francs, which is the biggest increase of all the ministries, compared to 13.26 percent for the total state budget.

In this total, research gets the lion's share with Fr 32.5 billion (more than 28 percent compared to 1982 and 118 percent in 3 years). (See Table 1)

The 52 billion is distributed as follows:

--the civilian research budget will be Fr 32.5 billion;

--some 19.7 billion will be devoted to the promotion of industry and energy policies and 2 billion will be added to this sum as special funding for large projects.

--Speaking only of the funding in the budget documents that have been presented to parliament, the total funding amounts to Fr 36.2 billion, of which 23.5 [billion] is for the research portion and 12.7 [billion] for the industrial portion.

Creation of Jobs

In 1983, thanks to the funding provided in the draft budget, employment in public research will reach 59,674 persons (compared to 47,000 in 1980) and it will be possible to create 2,462 jobs, 696 for researchers and 1,766 for engineers, technicians and administrative personnel. (See Table 2)

Confirming that "research is the lungs that make industry thrive," and that in his opinion, "basic research is a privileged tool on which the government expects to base its policy,' Jean-Pierre Chevenement pointed out that fundamental research will experience an increased funding of 13 percent in volume next year. As for mobilizing programs, they will be the beneficiaries of an increase of 62 percent between 1982 and 1983.

"I had promised to undertake a rebuilding of our national research apparatus. For the past year, with the passing of the law on orientation and planning of research, the reform of the CNRS [National Center for Scientific Research], of the CEA [French Atomic Energy Commission] and the reorganization of the departments of the ministry have taken place," added the minister.

"In the next few months, I will finish developing the new structures of INSERM [National Institute of Health and Medical Research], GERDAT [Study and Research Group for the Development of Tropical Agronomy], ORSTOM [Overseas Scientific and Research Office], and CNEXO [National Center for Oceanic Exploitation]. We are going to launch the first GIP (Public Interest Groups) in the next few weeks (the minister is to inaugurate the first of them at Besancon).

"The new status of personnel in the public research establishments is in course of elaboration. The months of September and October will be devoted to negotiation with the unions and to interministerial coordination."

(Table 3 shows the planned distribution of funding on the 1983 budget of the Ministry of Research and Industry among the various large research organizations.

(It can be noted that the CNRS funding is being increased by close to a billion francs (Fr 989 million), that of the INRA [National Institute for Research in Agronomy] by 227 million and that of INSERM by 210 million.)

Table 1. Civilian Budget for Research and Technological Development: Programs
(figures in billions of francs)

Programs	Operating Expenses 1982	Operating Expenses 1983	Program Authorizations 1982	Program Authorizations 1983	Total Funding (Ordinary Expenditure plus Program Authorizations 1982	Total Funding (Ordinary Expenditure plus Program Authorizations 1983	Change 83/82
Mobilizing Programs	2.2	2.6	3.1	6.0	5.3	8.6	up 62 percent
Basic Research	3.9	4.8	2.4	3.0	6.3	7.8	up 24 percent
Applied and Finalized Research	2.2	2.7	1.5	1.8	3.7	4.5	up 22 percent
Programs for Technological Development	1.7	2.0	4.9	6.1	6.6	8.1	up 23 percent
(Nondistributed Indirect Funding)	2.7	3.1	2.4	2.4	5.1	5.5	up 8 percent
Civilian Budget for Research and Technological Development	12.7	15.2	12.7	17.3	25.4	32.5	up 28 percent
(1) direct products of the CEA [Atomic Energy Commission]			(1) up 1.6	(1) up 2.0	(1) up 1.6	(1) up 2.0	

Table 2. Funding in the Civilian Budget Draft for Technological Research and Development 1983

[Categories of Funding]	1983	1982	Increase from 1982 to 1983
Total employment	59,474(1)	57,012	up 4.3 percent
Jobs created	2,462 (696 for research and 1,766 for engineers, technicians and administrative)		
Operating expenditures (in million francs)	15,216	12,713	19.7 percent
Program authorizations (in million francs)	17,311	12,702	36.6 percent
Payment funding for investments (in million francs)	15,224	10,753	41.6 percent
Total funding (Operating expenditures plus program authorizations (in million francs)	32,526	25,415	28.0 percent (or 17.8 percent by volume)

More than three-quarters of the funding of the civilian budget for research and technological development is in the budget for the Ministry for Research and Industry (Operating Expenses plus Program Authorizations equal Fr 25,284 million). The other funding, which is in the budgets of the various ministries, is subjected to interministerial coordination under the authority of the Minister of Research and Industry.

(1) Not including the 200 jobs for agents of the DRET [Directorate of Research and Technical Studies

Table 3. Funding in the Budget of the Ministry of Research and Industry

(1) (Operating Expenses, Program Authorizations, CP [expansion unknown])
(figures in millions of francs)

	(2) Operating Expenses		(3) Program Authorizations		(4) CP		(5) Total (OE + PA)	
	1982	1983	1982	1983	1982	1983	1982	1983
(6) Section 1. -- Research								
(7) Ministry funding (Central administration, chapt 43-80, 56.00 art. 40, 56-06, 56-07 57-01, 66-01, 66-04, 66-06 and 66-07)	300.768	321.972	855.000	1,165.767	650.000	830.831	1,155.768	1,487.738
(8) CNRS [National Center for Scientific Research] and National Institutes	4,567.827	5,233.260	1,378.400	1,702.000	1,176.000	1,578.120	5,946.227	6,395.260
(9) CEA [Atomic Energy Commission]	3,246.200	3,989.150	2,015.600	1,858.000	1,250.000	1,533.300	5,261,800	5,847.150
(10) CNES [National Center for Space Studies	327.115	472.745	1,818.470	2,264.638	1,599.464	2,273.018	2,145.585	2,717.383
(11) INRA [National Institute for Agronomy Research	1,214.207	1,408.265	295.000	327.800	249.000	307.870	1,509.707	1,736.065
(12) INSERM [National Institute for Health and Medical Research]	609.674	824.234	352.000	427.000	312.000	427.370	1,041.674	1,251.234
(13) Pasteur (Paris)	75.307	88.722	68.000	79.000	62.000	75.080	143.307	167.722
(14) Pasteur (overseas)	8.816	13.398	4.000	5.000	4.000	5.000	12.816	18.398
(15) Pasteur (Lille)	/	/	8.000	9.500	9.000	3.100	8.000	9.500

[Table 3. continued next page]

[Table 3. continued]

	(2) Operating Expenses 1982	1983	(3) Program Authorizations 1982	1983	(4) CP 1982	1983	(5) Total (OE + PA) 1982	1983
(16) CNEXO [National Center for Oceanic Exploitation]	136.350	175.724	264.030	314.700	206.030	298.680	400.380	490.424
(17) ISTPM [Scientific and Technical Institute for Deep Sea Fishing]	57.973	64.377	35.000	27.500	21.100	33.340	92.973	91.877
(18) AFME [French Energy Control Agency]	20.000	28.120	280.000	363.200	121.000	251.970	300.000	391.320
(19) ADI [Association of Regional Economic Research Institutes or Association for Computer Development **	35.500	26.218	247.000	268.320	118.000	234.540	282.500	294.540
(20) INRIA [National Institute for Research in Data Processing and Automation]	91.876	113.177	65.000	73.000	44.000	67.860	156.876	186.177
(21) ORSTOM [Overseas Scientific and Research Office]	390.048	438.826	71.000	93.000	69.000	87.070	461.048	531.826
(22) GERDAT [Study and Research Group for the Development of Tropical Agronomy]	227.122	271.762	75.000	88.500	74.000	83.960	302.122	60.262
(23) ANVAR [National Agency for the Promotion of Research	67.326	90.060	760.000	900.000	620.000	810.000	827.326	990.060
(24) Subtotal 1--Research	11,456.109	13,560.010	8,591.500	9,966.925	7,050.594	8,905.109	20,047.609	23,526.93

[Table 3. continued next page]

[Table 3. continued]

	(2) Operating Expenses 1982	1983	(3) Program Authorizations 1982	1983	(4) CP 1982	1983	(5) Total (OE + PA) 1982	1983
(25) Section 2. -- Industry								
(26) Mining School	68.050	82.641	13.800	15.500	10.800	12.576	81.850	98.141
(27) BRGM [Bureau of Geological and Mining Research	69.467	77.630	57.000	67.000	51.300	69.040	126.467	144.630
(28) BNM [National Bureau of Mines	9.188	10.744	13.000	16.000	11.300	16.500	22.188	26.744
(29) IRCHA [Institute of Applied Chemical Research	28.190	31.031	11.200	17.000	11.000	14.014	39.390	48.031
(30) CESIA [expansion unknown]	(--)	15.087	(--)	21.680	(--)	22.980	(--)	36.767
(31) Computer and Electronics	/	/	640.000	1,352.720	462.600	948.760	640.000	1,352.720
(32) Mineral Resources of the Oceans	/	/	60.000	30.000	43.000	25.000	60.000	30.000
(33) Miscellaneous	18.527	19.866	/	/	/	/	18.527	19.866
(34) Subtotal 2--Industry	193.422	237.000	795.000	1,519.900	590.000	1,108.870	988.422	1,756.900
(35) Subtotal I (M.R.I.) [Ministry of Research and Industry	11,649.531	13,797.010	9,386.500	11,486.825	7,640.594	10,013.979	21,036.031	25,283.835

** Including the CESIA in 1982.

FRG AUTO MAKERS EXHIBIT ALTERNATE-FUEL PROTOTYPES

Helsinki HUFVUDSTADSBLADET in Swedish 30 Dec 82 p 13

[Article: "Germans Are Test Driving With Alternate Fuels"]

> [Text] In recent years a large number of so-called cars of the future have been revealed, some of them only as prototypes so far, some at least suitable for series production. In general, all of the automobile factories have some kind of test going on. The Germans also have shown great interest in alternative fuels, and these experiments have received economic support from the government. Volkswagen is testing methanol and alcohol in the gasoline, Mercedes-Benz is driving on hydrogen, electric motors, gas turbines and turbocharged engines.

Daimler-Benz also has a car called the Auto 2000, which is similar to Audi and VW. Different engine alternatives are being tested in it. Mercedes also has a T model equipped with an electric motor, and another T model has been modified to run on hydrogen. Daimler-Benz presented these test cars at the Hanover trade fair and other places.

Battery power

An electrically driven passenger car built on a Mercedes T gives an insight on the research on electrically driven cars for private use. The electrically driven passenger car, with which they intend to gain experience in traffic through 1983, is equipped with, among other things, a new nickel-steel battery which has double the energy capacity of conventional lead batteries. The automobile, which is equipped with a 32 KW, 41 horsepower electric motor, has the same high equipment and comfort standards as other Mercedes cars.

With battery power a top speed of 80 km/hour can be reached, and a range of 100 km (when driving at a constant speed of 50 km/hour). With a battery charger the battery can be connected to any regular outlet (220 v., 16 a.). As extra equipment a carburetor engine is available with which one can drive an additional 50 km.

Hydrogen Power

A passenger car with hydrogen power is part of a fleet of 15 Mercedes T cars which, as part of the research activity supported by the West German Ministry of Research and Technology, will be tested in daily traffic starting in the beginning of 1983. Ten of the planned cars are completely rebuilt for hydrogen power; with the other five cars they will try to gain experience with combined hydrogen/gasoline power.

As a basis for the hydrogen power there is a "low-temperature-metal-hydride container" which is built like a tube heat exchanger. Exhaust heat is led to this, with water. Thereby the hydrogen which is combined with the metal hydride is released. Cold starting is free of problems down to -20°C. The fuel system makes it possible to refill in less than 10 minutes. The engine, which is converted to hydrogen power, is basically a 2.3 liter four-cylinder standard injection engine.

On the other hand the engine for combined hydrogen/gasoline power is based on a 2.8 liter six-cylinder injection engine. This engine version was developed in cooperation with Professor May of Kaiserslautern University. The engine is supplied with hydrogen and gasoline simultaneously by way of an automatic regulator: with increasing load, the gasoline supply increases from 0 percent (idle) to 100 percent (full load). Substituting part of the gasoline with hydrogen makes it possible to have better exhaust efficiency and reduced fuel comsumption by 20 percent (compared with the thermal efficiency of the fuels used).

'Auto 2000'

There are three different possibilities for motive power for the Daimler-Benz research passenger car "Auto 2000": a supercharged diesel engine, a V8 carburetor engine with disconnecting cylinders and a gas turbine.

The diesel engine of light metal is constructed like a 3.3 liter V6 with turbochargine (two series-connected exhaust turbochargers). It works by the prechamber method, and for suppression of sound it is entirely enclosed together with the automatic shift. The nominal efficiency of this especially economical, compact and fuel-efficient engine is 110 KW.

The 3.8 liter V8 light metal engine has, through reduction of the maximum RPM been limited to about 110 KW. A central electronic system is used to control ignition, injection, idle speed and cylinder disconnecting at partial loading, in order to attain more favorable fuel utilization.

Gas Turbine With a Two-Way Principle

The Mercedes-Benz gas turbine is built according to the two-way principle. A condition for building a gas turbine with low utilization is that the very heat-resistant ceramic turbine wheel can be eliminated. At Daimler-Benz

during test operations they have reached temperatures up to 1,250°C at 60,000 RPM. As a use value they are trying to reach 94 KW.

The electronic element will further perfect the principle which Daimler-Benz AG has claimed for so many years, namely relaxing comfort, especially as it concerns the "driver-vehicle dialogue." The control and information system in the research cars is activated first according to specification so that it will give the driver the basic information he must have, but also not distract his attention the entire time.

The information system consists of an information recording unit instead of the traditional instruments. Normally the monitor only reports speed, tank contents, time and distance measurements. In addition one can call for RPM, oil pressure and water temperature. Other information which the driver has available is measurements (information on conditions which are important to safety), maintenance data (reporting the time until the next service), trip data (for example, information on fuel consumption) and distance measurements (electronic road atlas).

To further improve active safety there is the ABS system (nonlocking brakes), a radar warning device and a device which regulates the speed of the wheels (to prevent wheels spinning when accelerating).

'Heat Filter'

In the same way as in space technology, engineers in the auto industry are constantly developing new details which certainly apply to the automobile, but can also be interesting for other future uses.

The so-called "heat filter" is a storage installation which, without valves or moving parts, distributes heat automatically according to the temperature, shows unexpected possibilities for utilization in industry and also in the home. It provides optimum utilization of remote heat of varying temperatures, or an improvement of operating temperatures in solar heating installations compared with installations with conventional storage.

The "heat filter" differs from previous heat collecting systems by having a collector which is divided in several cells, and the so-called heat pipes. They function with these as a heat transfer element with high efficiency where water or some other medium is set in motion by converting it to steam or by concentration. They make possible a goal-oriented supply of heat to the different temperature zones, but prevent losing heat by heat transfer going in the wrong direction. Solar and remote heat is thereby sorted or filtered, giving the name "heat filter."

As for the propulsion system which works on the collection of energy, the problem arises of storing remote heat at different temperature levels with high efficiency. So they came up with the idea of a "heat filter," or a heat collector which stores the incoming heat flow at the highest possible temperature, without the parts of the collector, which are already at a high temperature, losing their heat.

The principle of the "heat filter" is not yet usable in automotive technology. The many promising areas of utilization are primarily in heating houses with environmental energy (heat pumps), solar energy or heat recovery. In these areas the supply of and need for heat are divided from each other in time, so it is significant to collect the heat in collectors. The "heat filter" now makes it possible to utilize heat more effectively.

9287
CSO: 3698/135

AIRBUS INDUSTRIE: PRODUCTION RATES, NEW PARTNERS

Paris L'USINE NOUVELLE in French 11 Nov 82 p 49

[Text] "10 years ago, when we set up Airbus Industrie, we were a very small company in a booming market. Today we are number two in the world, behind Boeing, but the market is very bad." Bernard Lathiere, administrator-manager of Airbus Industrie, does not hide the fact that the next 2 years are going to be very hard, even though he is very careful to try not to overemphasize the reasons for his concern.

"Compared to the other manufacturers, such as Boeing, Douglas, and MBB [Messerschmitt-Bolkow-Blohm], we have definitely been less affected by the crisis that is hurting the airlines, and thus the manufacturers as well. Our strategy has not been changed. So the rate of production of the Airbus, which is 4.8 planes a month, will rise to five, then to six. But we won't go as high as eight, as our orders for the moment don't justify that rate."

To succeed with this policy, Bernard Lathiere has decided to open the consortium up to other partners. To make sure the Airbus A 320 is successful, that has become essential. At least, that is the opinion of Lathiere. At the moment, the group consists of Aerospatiale (37.9 percent); the German company, MBB (37.9 percent); British Aerospace (20 percent); and Casa Espagne (4.2 percent). The possible new consortium members are: the Canadians, with De Havilland, which is thinking of putting up 8 percent; the Dutch, Fokker (15 to 20 percent), the Italians, with Aeritalia (15 to 20 percent), and also the Japanese.

Won't that be too many? "In 10 years, the consortium has evolved enormously; for example, it takes us five times fewer workers now to build an Airbus than it did when we started. Expanding our cooperation will give our organization a better

financial basis, and thus make it easier to introduce the new planes that we have decided to build in the future. Of course, this means that the present Airbus Industrie members will have to redistribute their shares and their work."

Today Airbus Industrie lists 350 firm orders among its assets. "We have almost 2 and 1/2 years of work ahead of us. But this period will be aggravated by the financing costs that we will have to pay, caused by delayed orders, the fact that some of our clients may back out, and also the decline in orders. Our method will be to hang on as long as necessary so we may be among the first to take advantage of the recovery as soon as it comes," said Bernard Lathiere.

Right now, the situation is not a good one. In 1982, Airbus Industrie sold only 17 planes, compared with 45 sold in 1981, and the start of the A 320 is still being delayed by the uncertainties about its engine, although Bernard Lathiere, in this respect seems fairly optimistic, and also about the number of airlines that are really prepared to order this new plane.

7679
CSO: 3698/88

GERMAN-JAPANESE HELICOPTER RECEIVES CERTIFICATION

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 15 Dec 82 p 5

[Text] Ottobrunn, 14 Dec--The twin-engined multipurpose BK 117 helicopter, a joint project of Messerschmitt-Boelkow-Blohm GmbH (MBB) and the Japanese Kawasaki Heavy Industries (KHI), has been certified by the German Federal Aviation Board for visual flight. In addition to the normal conditions, there is a stricter requirement in the certification stating that in no phase of takeoff, following failure of an essential helicopter system, must an emergency landing be attempted, but, because of a prescribed redundancy of basic systems and, under certain conditions, realized climbing reserves, the flight can be continued if necessary.

The certification corresponds to the increased flight safety requirements for passenger aircraft operated in scheduled traffic. Certification through the Japanese air authorities is also expected soon. Based on these two certifications, the aim is a constant expansion of the model BK 117. The necessary work is already in progress for American, British and Canadian certification and also for extending certification for instrumented flight through various boards of aviation.

The two manufacturers see in the certification of the BK 117 an important milestone not only in its developmental history but also in the international helicopter industry. For the first time a helicopter has been developed and built in a German-Japanese partnership. The initial contacts were made between the two firms in 1974, when MBB, following the worldwide success of the light multipurpose BO 105 helicopter, asked about a long-term oriented expansion of the helicopter range. In 1977 a cooperative contract was signed, which included development, manufacture, marketing and customer service for the BK 117. Both companies brought existing technical knowledge to the joint project. In order to reduce the technical and economic development risk, major parts of the BO 105 were adopted. MBB bore the responsibility for configuration and program management, development and integration of the systems and for the rigid "Boelkow System" rotor, tail rotor and tail rotor drive system, the complete tail boom, the hydraulic system, the mechanical controls and finally for parts of the landing gear.

The Japanese developed and are building the main rotor transmission, the fuselage, mechanical control parts, fuel and lubrication system, landing gear, cabin interior including the cockpit and instrument installation. The BK 117 is being manufactured using the "single-source" process, that is to say, both companies themselves manu-

facture the components and assemblies they have developed and then exchange them. Final assembly of the helicopters takes place on an assembly line in the MBB Donauwoerth factory and in the KHI Gifu factory. The construction of production machines is already running at full speed.

Marketing considerations also play an important part for the two partner firms, which are more than 12,000 kms apart. As a result of the cooperation, MBB became a partner in the Japanese market with the BK 117, from which the company expects positive consequences for the products of other MBB manufacturing areas. KHI profits from MBB's many years of experience in sales at home and abroad. The availability of numerous pieces of special equipment endows the new multipurpose helicopter with a manifold spectrum of applications. In many countries the BK 117 is being looked at as a rescue helicopter, in the United States interest is turning principally to its use as a business helicopter.

For special applications, MBB offers a close-seating ("high-density") version, in which there is room for 10 persons in the cabin besides the pilot. The BK 117 is also suitable for off-shore use and for freight transportation. The first manufacturing lot has already been sold, according to MBB. More than 60 percent of the orders received so far are from the United States.

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CSO: 3698/129

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